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ABSTRACT

The Program Evaluation and Review Technique (PERT) implies the necessity to program the sequence of steps leading to the completion of a product. It takes cognizance of the need to define clearly each event and recognizes the obligation to describe the start and/or the completion of the interdependent activities. Essentially, the PERT chart is a graphic representation of a process. The Waverly School PERT chart visualizes the major events in the plan for opening the new elementary school. PERT chart construction is a catechistic process of plotting events and activities systematically. Events are points in time depicted by a circle. They consume neither time nor resources. Activities, which expend time, money, personnel, and/or other resources, are designated by the line connecting events. As an example of the application of the PERT technique to education, a discussion of the events in the Waverly PERT chart is presented. (Author/IRT)

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PERTING THE NEW WAVERLY SCHOOL

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PERTING THE NEW WAVERLY SCHOOL

BACKGROUND

Confrontation and crisis continue to characterize core-city education. Hartford, Connecticut, however, is among the urban centers making significant progress toward potential solutions. Under the leadership of Superintendent Medill Bair, the school system has developed a comprehensive plan, Hartford '74, for educational reorientation designed to meet pupil needs in the Seventies.

A vital component of Hartford '74 is a multi-million dollar building program that will provide two new schools at each level, elementary, middle and secondary. Building designs incorporate the facilities necessary to implement the projected instructional program.

Waverly School, scheduled to open in September, 1970, typifies the rewarding results of combining architectural application with educational innovation. A fundamental concept reflected in the 1,000 pupil elementary school which will accommodate pre-schoolers and pupils through the equivalent of grade six, is the Multi-Instructional Area or MIA.

Each MIA is a large, open-space area equivalent in size to four traditional classrooms. MIAs will serve about 100 pupils grouped on a multi-age, non-graded basis. Cooperative teaching teams consisting of three or four teachers will be assisted by paraprofessionals. Within each MIA specific areas are available for dramatic play, creative arts, science activities, and content subject learning. Provision is made for small group and individual, self-directed learning environments.

Consequently, MIA means more than Multi-Instructional Area. To pupils it means Maximum Individual Attention. To teachers it means Multiple Instructional Advantages.

Supplementing the MIAs, Waverly contains regular classrooms as well as rooms for pupils with special needs ranging from educational to emotional handicaps. Centers for resources, food service, parent-teacher interaction, day-care, recreation, music, art, physical education and an auditorium will encourage the development of a community centered school.

To the same extent that Waverly illustrates the cooperative effort of educators and architects, recognition must be given to the variety of practices and procedures that industry and education have developed mutually in the past several years.

Economic education emphases in the curricula of school levels spanning from kindergartens to graduate centers illustrate one aspect of combined effort. Work-study programs are another reflection of Boards of Education and industrial management sharing opportunities and responsibilities.

Equally as significant as the expanding development of joint programs is the increasing recognition that the techniques utilized in both education and industry have, in many respects, a high degree of relevancy to each other. Industrial training programs have drawn on educational know-how. Audio-visual education has profited from industrial skills. Assessment devices in industry based on product, performance and accountability increasingly have conditioned their counterparts in education.

PERT CHART TECHNIQUE

The PERT CHART is an industrial management technique which also has considerable applicability to education. It merits the intensive interest of leadership personnel within the school system and the particular attention of those charged with managerial, organizational and administrative responsibilities.

Essentially, the PERT CHART is a graphic representation of a process. The WAVERLY SCHOOL PERT CHART (Fig. #2) visualizes the major events in the plan for opening the new elementary school. Industrial charts identify the processes for such diverse objectives as building a bridge, marketing an electric razor or planning a shot to the moon.

PERT is an acronym for Program Evaluation and Review Technique. In industrial computer talk, it implies the necessity to program the sequence of steps leading to the completion of a product. It takes cognizance of the need to define clearly each event and recognizes the obligation to describe the start and/or the completion of the interdependent activities.

PERT CHART construction is a catechistic process of plotting events and activities systematically. Events are points in time depicted by a circle. They consume neither time nor resources. Activities are designated by the lines connecting events. They expend time, money, personnel and/or other resources.

The Waverly School network is the result of planning backwards from the school opening. The planning coordinator applies a deductive process which is an exercise in logic. He asks: "What must happen, and how much of it happen to permit the start of the step being considered?"

The total time probability in PERTing is the product of its component probabilities derived from three time estimates, optimistic time, most likely time and pessimistic time. The Waverly chart, however, used only the most likely time, superimposed as a calendar time line. Previous experience of management personnel justifies the modification. Educators familiar with the preparation of directed-arrow sociograms and the charting of group interaction will recognize that PERTing is an extension of a related technique into further dimensions.

Using the device, industrial management can chart the intricacies of a process and the materiel flow necessary to planning a bridge, a razor or a moon shot. Educational management can chart the planning of a school, an in-service training program or budget preparation. The PERT CHART not only specifies the events necessary as sequential steps to achieve the objective but also sets time parameters. Through the descriptive legend for the event it identifies the responsible personnel for the initiation and completion of each step in the network culminating in the product.

Applied to the planning for the opening of a new school, the process of PERTing has much to commend it. Analysis of the WAVERLY SCHOOL PERT CHART SUMMARY (Fig. #1) indicates the series of 33 events that have been identified as necessary to the school opening. It also records personnel with primary and related responsibilities. Each of the activities listed is capable of further reduction into a series of steps that result in each school system department PERTing their own functions as they prepare to meet their obligation to the over-all plan. *

Study of Figure #2 leads to several conclusions. The PERT CHART provides information relative to the identification of the major events, their sequence, their interrelationships, the time intervals between event initiation and completion and the determination of responsibilities to be assumed by central office personnel. In effect, the PERT CHART becomes the coordinating vehicle for the accomplishment of a school system objective.

The PERT CHART may be color coded or otherwise keyed to highlight the responsibilities and functions of central office personnel. Such a chart may be used as a follow-up device by the coordinator of planning to alert personnel to functions and due dates. Accompanied by a memorandum, it becomes an effective visual tool in clarifying both primary and secondary obligations. For example, items #12, 15, 18 and 27 are of basic concern to the head of custodial services. Item #19, however, requires coordination between the purchasing department and the custodial division.

Figure #3, the EVENT INVENTORY CHART, is yet another device used to visualize progress in the initiation and completion of scheduled events. Provision is also made for the coding of events that are overdue.

* Figures #4 and #5 illustrate the PERT network for the plan necessary to complete event #25 in the School Opening PERT.

In actual practice, the coordinator for planning presented the proposed events and the initiation dates to the Assistant Superintendent for Instruction and the Director of Elementary Education. Following their tentative approval, the plan was submitted to a conference of department heads and then, with their agreement on responsibilities and dates, it was forwarded to the Superintendent and his Deputy. The final step was presentation to the Board of Education. Periodic reviews of the areas of responsibility will indicate the changes necessary on the network, focus attention on required remedial action and permit adjustments in the application of resources.

PERT CHART RATIONALE

Certainly, no Superintendent or Board of Education facing the fiscal and staffing problems common in the inner-city would be favorably disposed to the acceptance of a plan presented solely on the basis of a chart. They demand substantiation for personnel, program and materiel expenditures that require a detailed budget projection and the rationale supporting the charted events. Both documents are vital and prerequisite to plan acceptance.

Since the primary purpose of this review is the technique of PERTing and its educational application, description of new school budgeting is restricted to the major items essential in the presentation of such a budget. The Waverly School Budget included the following:

1. Bond Issue Equipment
2. Texts and Related Materiel
3. Instructional Supplies
4. Warehouse Storage
5. Custodial-Sanitary Supplies
6. Faculty, Parent-Teacher Room Supplies
7. Library Books and Supplies
8. Office Supplies
9. Medical-Dental Supplies
10. Staff Salaries
11. Extended SchoolDay Costs
12. MIA Team Training Program Costs
13. Food Service Equipment
14. Telephone Service

Day Care Center and Community Recreation Center Expenditures are submitted to the City Manager by other city departments.

The following rationale supporting the PERT CHART refers to the events in Figures #1 and #2.

I. Staff Budget (see Event #1 and Budget Analysis)

The predetermination of staff positions for budget purposes is acceptable despite the fact that it occurs prior to the designation of the pupil population and the development of the educational program.

It must be recognized that:

a. fiscal policies require cost anticipation for budget purposes

b. staff positions are determined by building plans which reflect the recommendations of the school system professional staff

c. recommendations of the professional staff for the buildings were predicated on their knowledge of the probable nature of the school population, the instructional staff and the educational program.

In effect, the building is a reflection of the expressed views and recommendations of system staff relative to educational needs. Therefore, the determination of school staff costs by using the building as an indicator is an acceptable procedure.

II. Equipment, Furniture and Instructional Supplies (See Event #2, 8, 19)

The analysis and preliminary clerical functions anticipating actual ordering are required during October.

This target recognizes that:

a. budget projections require "pricing-out" major items of equipment and furniture at this time

b. per pupil allocations for instructional supplies and texts can be determined during October but actual ordering should involve school staff and be deferred to coincide with system ordering during March.

c. bid and requisition items of furniture and equipment should be completed early in January to insure delviery for school opening.

d. delivery dates are designed to provide four months lead time before school opening.

III. Administrative Positions (See Event #3, 4, 7, 28)

The leadership role envisioned for the principal and the assistant principals of Hartford's new elementary school requires early appointment (January, 1970).

Hartford subscribes to the view that the principal is the responsible educational leader of his school. To implement this concept it is vital that he be involved as soon as practicable in all matters relating to staff, instructional program, community and the varied functions contributing to implementing these areas.

The principal and vice-principals are the keys to developing and implementing the school's mission. The assumption of their leadership roles requires active, continuous involvement with the school at the earliest date.

The following is a job description of the new school principalship and supplements the system job description.

The principal of the new elementary school presently in construction will assume a leadership role in developing and/or implementing:

a. The instructional program including:

   1. an early childhood education program
   2. an adjustment program for selected pupils
   3. a co-curricular, interest-activity after-school program
   4. a program of individualized learning

b. The in-service training program for staff including:

   1. the effective and efficient utilization of MIA s
   2. the training program for team teaching
   3. the training program for teacher aides
   4. the training program for vice-principals

c. The program of community involvement including:

   1. the active aprticipation of community representatives in program plans

   2. the establishment and encouragement of a parent organization

   3. the active participation of parents in varied supportive roles (aides, volunteers, resource personnel, etc.)

In addition, the principal will be responsible for or involved in:

1. the establishment and functioning of a lunch program
2. recommendations for instructional material
3. recommendations for furniture and equipment

4. assignments of staff and pupils
5. orientation of pupil, staff and community
6. establishment and functioning of school office
7. transfer of pupil records from feeding schools

The need for the active participation of the administrator in the above stated functions dictates the dates itemized on the PERT CHART.

IV. Professional Staff (See Event #6, 9, 10, 11, 25)

As is the case with the school administrators, there is a vital necessity for the early identification, involvement and training of the instructional staff.

Target dates listed are conditioned by:

a. contractual agreements with the bargaining organization

b. recruitment needs for highly specialized personnel necessary for MIA teams and team leaders

c. training needs for assigned staff members

A. Training Needs - Overview

Approximately 50 aides and 50 teachers are presently in a MIA practicum phase in prototypes at several Hartford schools. It is reasonable to assume that potential leadership may be identified within this group. They have experienced a summer of training and will have had a year of instructional experience with MIA type teaching and learning at Kindergarten - Grade 1 level.

Although MIA team leadership in the new school may be an evolving process, a rotating assignment or a predetermined responsibility, there is still a need to provide training.

Another factor requiring consideration is the initial success being achieved in several MIA prototype rooms. It increases the probability of continuation and expansion of MIA type programs in seven schools. Since many teacher participants will elect to continue in their present assignment, the training need becomes increasingly obvious.

Briefly, the cadre of teachers and aides will fall considerably short of the needs. The new school will require 26 teachers to staff seven MIAs. Additional staff is also needed to serve several classrooms which hopefully will function in conjunction with the MIAs.

In effect, there is an imperative need to provide two types of training:

a. MIA Leadership Training
b. MIA Team Training

B. MIA Leadership Training

It is urgently recommended that:

a. potential MIA leaders be identified immediately and participate with central staff and system consultants in a consideration of leadership course content

b. leadership identification for Waverly be "formalized" in January, 1970 permitting participation in program development and selection of instructional materials

c. the equivalent of 5 days training will be provided 7 teachers, 2 vice-principals and the principal during February and/or March (vacation period or 5 successive Saturdays)

d. that consideration during leadership training be given to such areas as:

1. clarification of the MIA leadership role
2. consideration of instructional leadership principles and techniques
3. consideration of management principles and techniques
4. sensitization to school community
5. sensitization to effective human relations
6. consideration of administrative teaming both intra-school and inter-school

C. MIA Team Training

It is recommended that:

a. an intensive program of summer training be provided for as many staff members of the new school as funding permits

b. to the extent possible consideration be given to the inclusion of:

1. adjacent school staff members
2. "partner" school staff members

c. the training program provide a realistic, clinical setting utilizing large, open-space areas with non-graded, inter-age pupil groups

d. participants experience to the fullest extent possible the opportunities and challenges inherent in the MIA teaching-learning concept

e. implementation of the training program might consider such areas as:

1. MIA instructional team and role definition

2. individualization of learning and teaching

3. multi-media utilization

4. curricular patterns to accommodate non-graded, inter-age groups

5. team planning for the teaching-learning situation

- stating specific objectives
- defining activities designed to achieve objectives
- implementing activities systematically
- evaluating achievement of objectives objectively

6. maintenance of continuous flexibility

- inter-team and intra-team assignments
- pupil grouping
- large-group management techniques

7. human relations sensitization

- team compatibility
- community sensitivity
- staff relations

8. inter-school teaming

- administrative
- staff

NOTE: Discussions with system consultants are underway. Meetings with MIA participants are scheduled to insure teacher viewpoint in training program planning.

Funds permitting, consideration of including aides in the training program is essential.

V. Program Planning (See Event #10)

Among the first obligations of the principal, in conjunction with selected MIA leaders, is the consideration of program.

The February/March leadership training program provides the principal with initial contact and, hopefully, limited time in which to initiate program exploration.

Thereafter, on a released time basis, MIA leaders and representative teachers in cooperation with the principal, central staff and school patrons will begin an in-depth approach to the instructional program.

Trial runs and refinements of program can be considered as part of the summer training period. Such activity will also broaden the participation base.

VI. Custodial Staff (See Event #12, 15, 18, 27)

Early appointment and assignment of the head custodian is critical. Such assignment permits building familiarization prior to closing in of such areas as ceilings, ducts, and innumerable access devices. At no other time can the custodian be trained in building equipment, plumbing, valve location and related items with as much clarity and efficiency.

Further, his presence at an early date provides additional insurance as deliveries take place. In cooperation with the principal, the storage and distribution of materials is facilitated by his initial involvement in receiving, storing and distributing building materiel.

The assignment of the custodial staff with sufficient lead time for training and assistance in items mentioned above is also indicated.

Since the matron will be concerned with "light" duties her assignment may be deferred until one month prior to school opening.

VIII. Secretarial Staff (See Event #13, 14, 26, 30)

Contractual agreements with clerical employees dictates the time of posting for these positions.

The vital necessity to provide the principal with full-time executive secretarial assistance prior to school opening justifies the initiation dates charted. Needs relative to organization, assignments, pupils' records, correspondence, program and overall planning substantiate the dates. .

School secretaries may begin work shortly prior to the opening of school. This will provide assistance at peak load time to the executive secretary and permit the establishment of offices in ample time for school opening.

The clerk's assignment may be deferred until the actual opening of school.

VIII. Enrollments (See Event #5, 17)

System staff members have already begun a series of "brain-storming" sessions on enrollment and school districting.

Factors considered and to be further explored include:

1. state level recommendations relative to racial ratios
2. racial composition of neighborhoods adjacent to the schools
3. districting devices alternative to those presently utilized
4. innovative approaches involving Greater Hartford.

The answer to the problem poses the obligation for imaginative solutions sensitive to the needs, desires and viewpoints of the variety of publics the urban public school system serves.

Study and observation of techniques in urban school systems is planned by central staff representatives.

Additional factors substantiating the early need for enrollment decisions include:

1. parental involvement in planning program
2. early notification of parents whose children are involved in a school change
3. determination of possible transportation needs

The necessity for decision on enrollment is imperative despite the intricacy of the probable solution. Enrollment, to a considerable extent, conditions the totality of the educative effort. We exist to serve pupils and to do the best job we must know who they are--and soon.

VIII. Assignment of Professional Staff (See Event #16)

Advance notice to teachers assigned to new schools is a professional obligation and courtesy deserving of the lead time indicated.

It may also provide personnel resources as program planning continues.

The principal requires such information to permit team identification and staff assignments.

IX. Pupils (See Event #20, 21, 24)

Sufficient advance time is required to permit the school administration to group, assign and notify pupils.

Orientation programs for pupils assigned to new schools might well include:

a. school visitation

b. guidance counselor visitation

c. teacher visitation

d. color-slide school familiarization

e. organization of safety patrol for opening

Transfer of records is, of course, not possible prior to conclusion of the school year but planning for clerical functions related to transfer is just part of the administrative obligation.

X. Food Services (See Event #22, 29, 31)

Personnel in food services may be difficult to recruit. Availability is limited and hourly scale is competitive but not overly conducive to attracting applicants. Only four of the staff will function as "appointees" while six will be "part-timers". Eight pupil supervisors will also be on "part-time".

Initiation dates for the cook-manager are designed therefore to provide sufficient lead time for recruitment, job familiarization and planning.

Food service workers and cashiers are scheduled for a week before school opening. Some modification in advance of target dates may be required for food service workers.

Pupil supervisors in lunch room should be available prior to school opening for orientation training sessions conducted by school administration.

XI. Aides (See Event #23, 32)

The recruitment and appointment of aides is as important as the same functions in selecting professional staff.

Aides are the visible, demonstrable evidence of community involvement. They also provide essential and significant services which permit the optimum functioning of an instructional team.

It is imperative that consideration for the involvement of instructional aides in the summer training program be given a high priority.

On a minimal training basis, aides should be available for orientation by administration and/or a MIA leader.

XII. School Opening and Dedication (See Event #33, 34)

The target dates represent the professional judgment of the architects and the central office staff.

NOTE: In joint meeting, all responsible personnel except the as-yet unassigned principal reviewed the PERT CHART.

There was acceptance of both functions and initiation dates in all instances except for the recommendation that posting for clerical positions be advanced one month.

CONCLUSION

The PERT CHART contributes an ingredient to educational planning which introduces management elements to a degree not generally employed. Planning for the opening of a new school building requires consideration of:

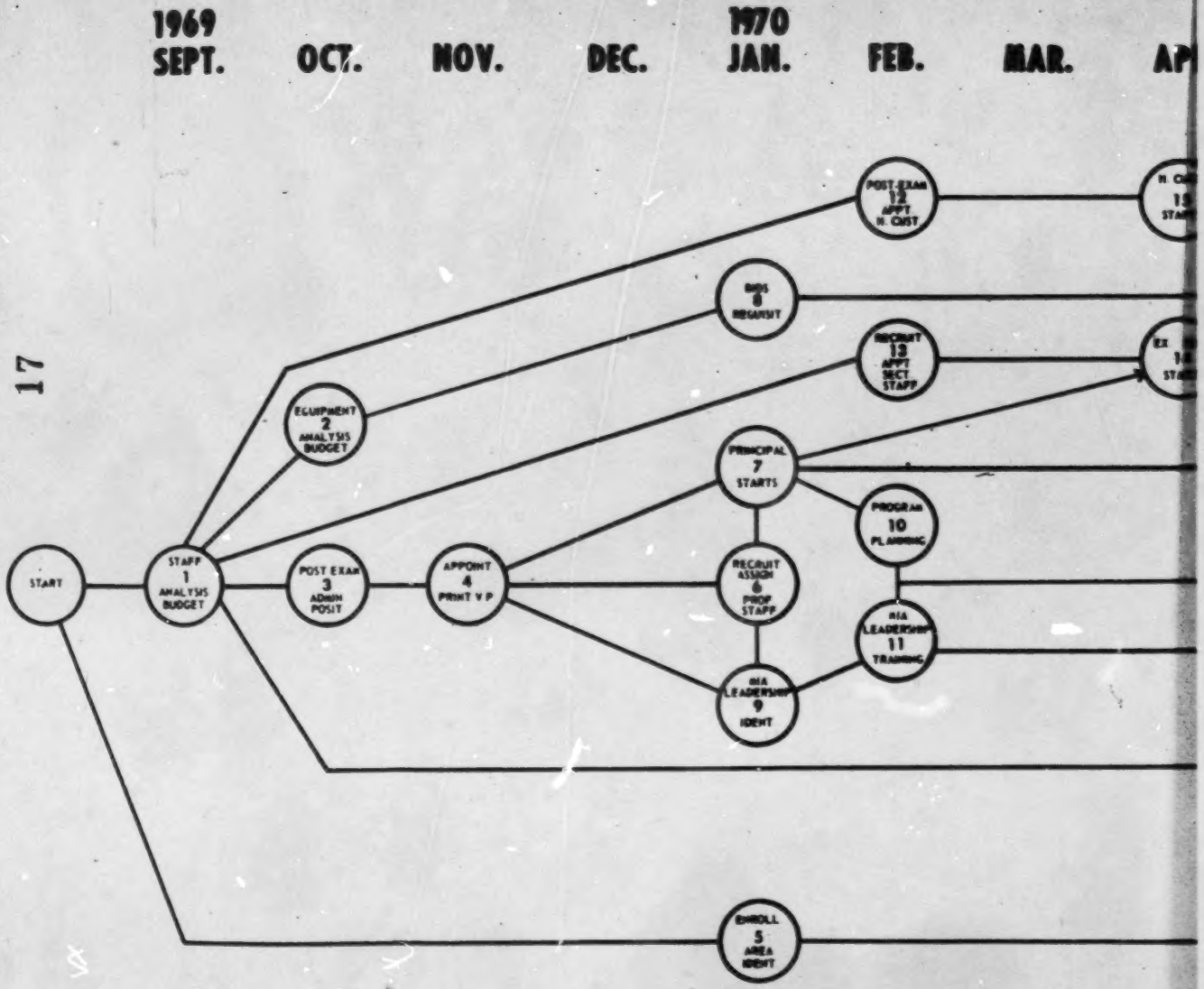
1. allocation of responsibilities
2. dynamic planning responsive to changing circumstances
3. a high degree of visibility reflecting the identification, contribution, and effect of each function.
4. emphasis on effectiveness as conditioned by efficiency and priority.

PERT CHART SUMMARY

WAVERLY SCHOOL

Figure #1

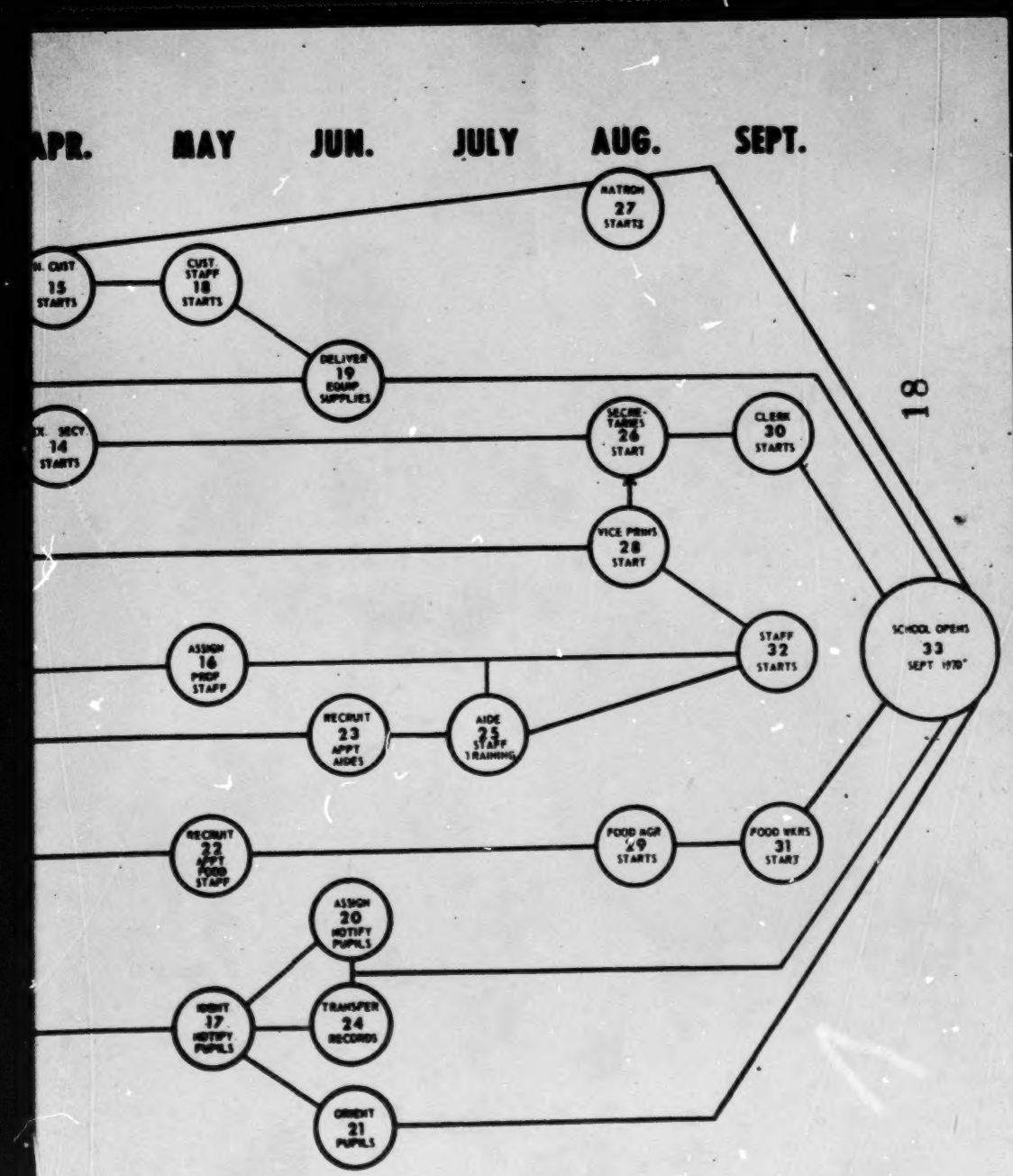
Code	Event	Initiation Date Waverly	Staff
1	Staff Analysis & Staff Budget	Sept. '69	Freedman
2	Equipment, Furniture & Instru.	Sept. '69	
	Supplies - Analysis	Oct. '69	Freedman
3	Posting of Admin. Positions & Exam.	Oct. '69	Fortin
4	Appt. of Prin. & Vice-Principals	Nov. '69	Calvert
5	Enrollment Area Identification	Jan. '70	Saxton
6	Posting and Recruitment of Professional Staff	Jan. '70	(Fortin (DiCorleto
7	Principal Starts Work	Jan. '70	Principal
8	Bids & Requisitions, Furn. Equip. Instru. Supplies	Jan. '70	Simmons
9	MIA Leadership Identification	Jan. '70	DiCorleto
10	Program Planning	Feb. '70	Principal
11	MIA Leadership Training	Feb. '70	DiCorleto
12	Post Head Custodian Position Administer Exam, Appoint	Feb. '70	(Fortin (Margolis
13	Post, Recruit & Appoint Clerical Staff	Feb. '70	(Macy
14	Ex Secy. Starts Work	April '70	Principal
15	Head Custodian Starts Work	April '70	Margolis
16	Assignment of Professional Staff	May '70	DiCorleto
17	Identification of Pupil Enrollees & Notification of Parents	May '70	Saxton
18	Custodial Staff Starts Work	May '70	Margolis
19	Delivery Date, Equip. & Supplies	June '70	Simmons
20	Pupil Room Assignments & Notification	June '70	Principal
21	Orientation of Students	June '70	Principal
22	Post, Recruit. & Appoint Cook-Manager, Food Service Workers, Cashiers	May '70	Beckstead Fortin
23	Recruit & Appoint Aides for Classrooms, Resource Center & Commons	June '70	(Neumann (Manson
24	Transfer of Records from Feeding Schools	June '70	Principal
25	Staff & Aide Training Program Starts	July '70	DiCorleto
26	School Secretaries Start Work	Aug. '70	Principal
27	Matron Starts Work	Aug. '70	Margolis
28	Vice-Principals Start Work	Aug. '70	Principal
29	Cook-Manager Starts Work	Aug 15 '70	Beckstead
30	Office Clerk Starts Work	Sept. '70	Principal
31	Food Service Workers & Cashiers Start	Sept. '70	Beckstead
32	Staff Starts Work - Tchers & Aides	Sept '70	Principal
33	School Opens	Sept '70	Principal
34	Dedication	Oct '70	Principal



WAVERLY SCHOOL PERT

SCHOOL OPENING PL

Figure #2



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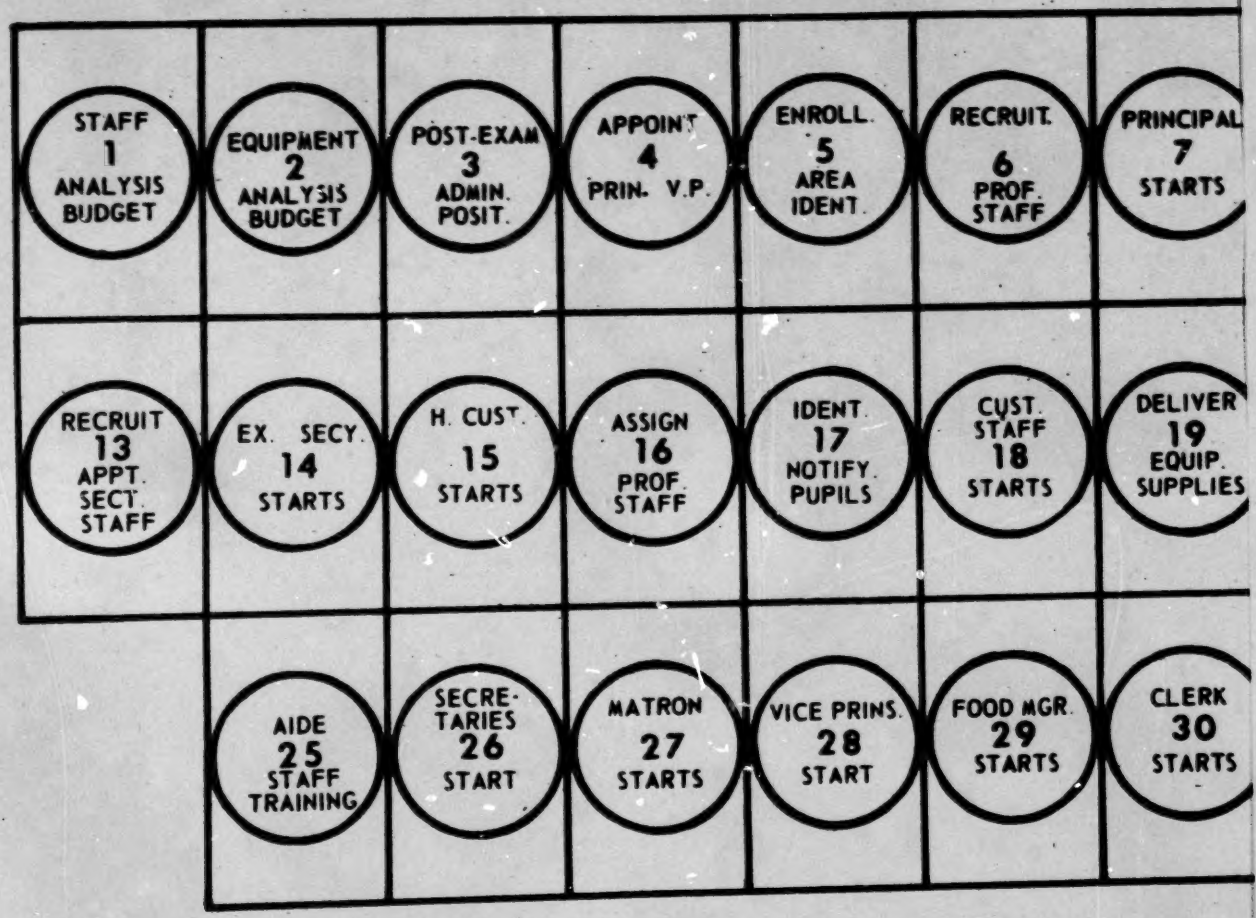

EVENT INVENTORY C
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Figure #3

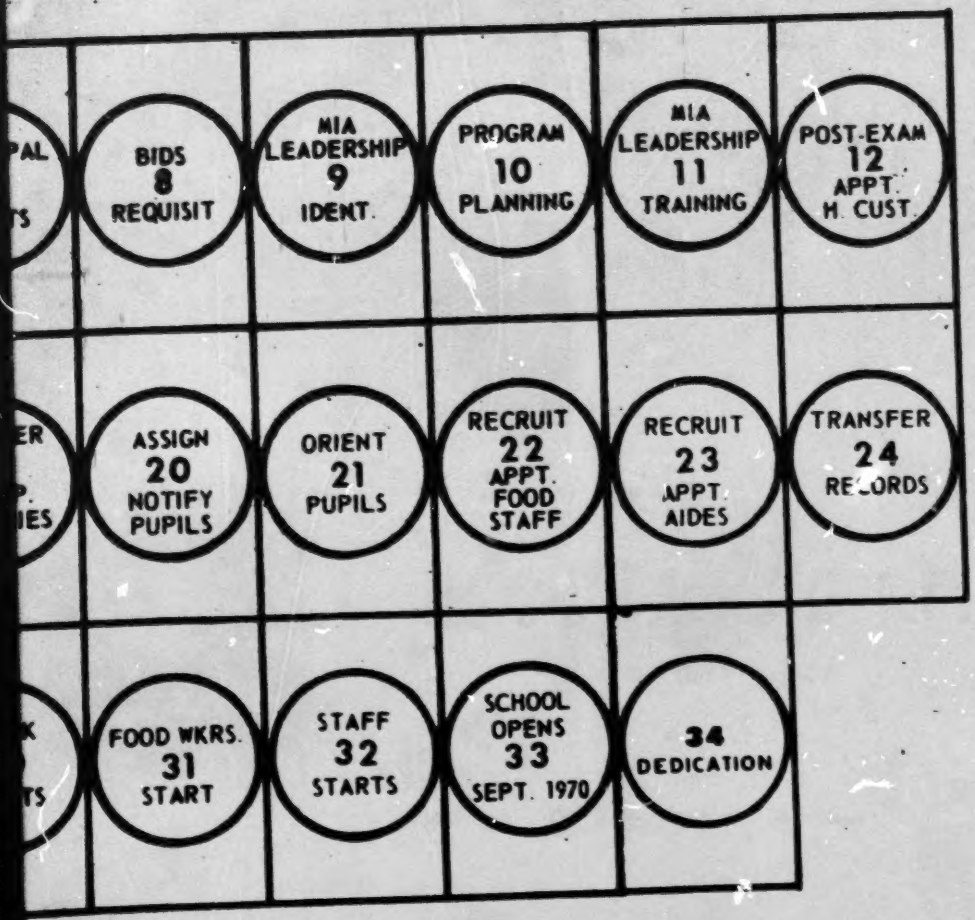


CHART
OOL

CODE

Initiation

Overdue

Completion

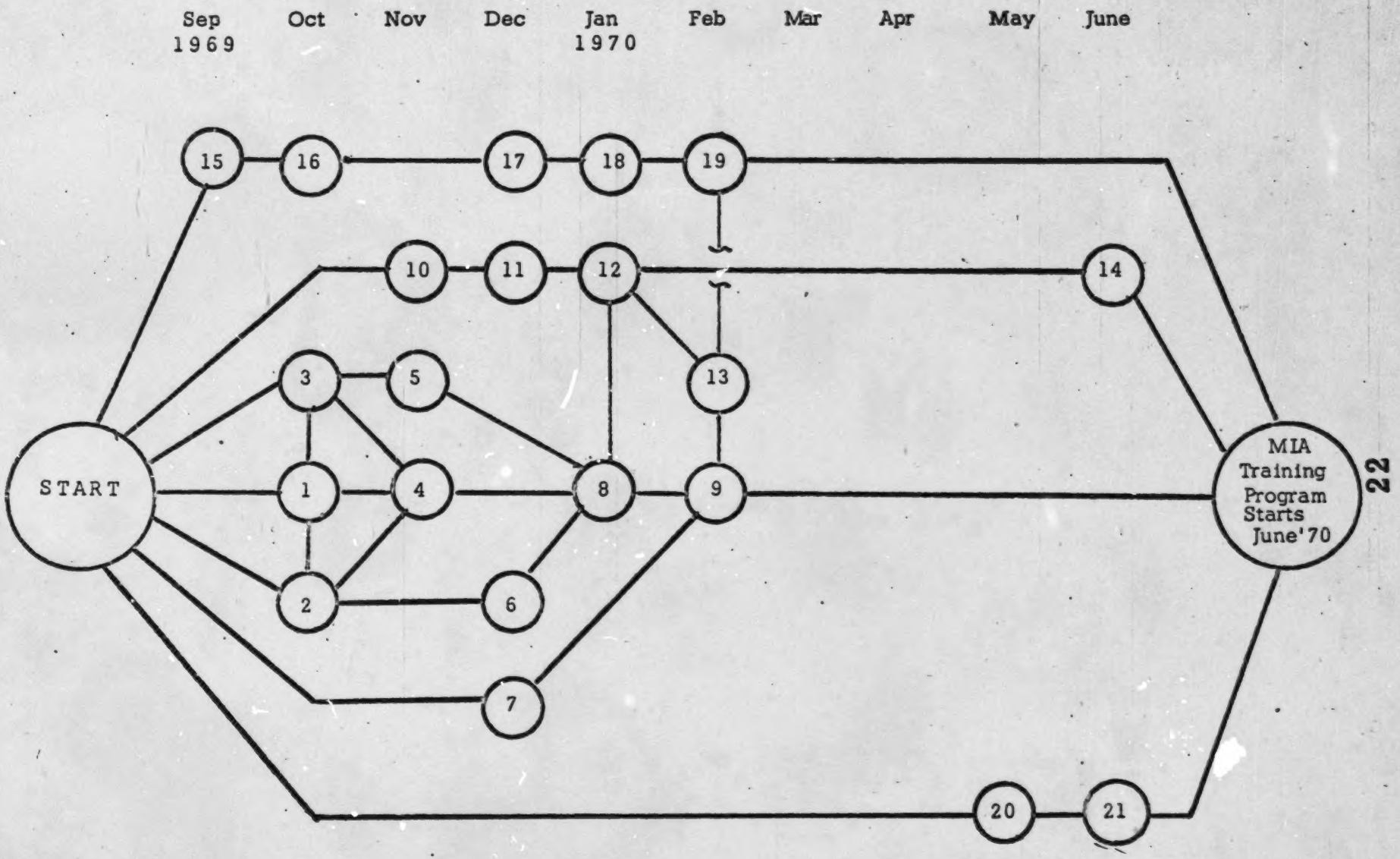
20

PERT CHART SUMMARY

Figure #4

Waverly School Teacher Training Program

Code	Event	Initiation Date	Staff
1	Hartford Teachers Discuss Program	October	Freedman
2	Nova Consultant Recommendations	October	Freedman
3	Harvard Consultant Recommendations	October	Freedman
4	Joint Program Recommendations	November	Freedman
5	Harvard Consultant Visitations	November	DiCorleto
6	Nova Consultant Visitations	December	DiCorleto
7	UConn Consultant Recommendations	December	DiCorleto
8	Program Revision and Acceptance	January	DiCorleto
9	MIA Leadership Program Starts	February	DiCorleto
10	Staff Recruitment Literature Preparation	November	Freedman
11	Recruitment Literature Distribution	December	Freedman
12	Waverly Staff Assignment	January	DiCorleto
13	Curriculum Planning Starts	February	DiCorleto
14	Aides Recruitment and Assignment	January	(DiCorleto (Neuman
15	Staff Analysis	Sept.'69	Freedman
16	Budget Preparation	October	Freedman
17	Budget Submitted	December	Freedman
18	Budget Allotted	January	Kelly
19	Funds Available	February	Kelly
20	School District Identification	May	Saxton
21	Pupil Recruitment Selection and Notification	January	Principal
22	MIA Team Training Program Starts	June	DiCorleto



WAVERLY SCHOOL PERT CHART

TRAINING PROGRAM

Figure #5